

# Black/White Differences in Prenatal Care Utilization: An Assessment of Predisposing and Enabling Factors

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**Objective.** This article reports on analysis of the predisposing and enabling factors that affect black/white differences in utilization of prenatal care services.

**Data Sources.** We use a secondary data source from a survey conducted by the Michigan Department of Public Health.

**Study Design.** The study uses multivariate analysis methods to examine black/white differences in (1) total number of prenatal care visits, (2) timing of start of prenatal care, and (3) adequacy of care received. We use the model advanced by Aday, Andersen, and Fleming (1980) to examine the effect of enabling and predisposing factors on black/white differences in prenatal care utilization.

**Data Collection.** A questionnaire was administered to all women who delivered in Michigan hospitals with an obstetrical unit.

**Principal Findings.** Enabling factors fully accounted for black/white differences in timing of start of prenatal care; however, the model could not fully account for black/white differences in the total number or the adequacy of prenatal care received.

**Conclusion.** Although there are no black/white differences in the initiation of prenatal care, black women are still less likely to receive adequate care as measured by the Kessner index, or to have as many total prenatal care contacts as white women. It is possible that barriers within the health care system that could not be assessed in this study may account for the differences we observed. Future research should consider the characteristics of the health care system that may account for the unwillingness or inability of black women to continue to receive care once they initiate prenatal care.

**Key Words.** Prenatal care, race, barriers, health services utilization, blacks

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It is well known that low birth weight and prematurity elevate the risk of infant death and play an important role in the development of chronic and debilitating medical problems during early infancy (Kleinman and Kessel 1987; Hughes et al. 1986). African American infants have higher rates of

low birth weight and prematurity than all other race/ethnic groups. Witwer (1990) reports that in the United States, 6.8 percent of all newborns weigh less than 2,500 grams and 10.2 percent are born prematurely. Among African American newborns, 12.7 percent are at low birth weight and 18.3 percent are premature.

Previous research has established that timely and adequate prenatal care is effective in reducing the likelihood of low birth weight and other adverse pregnancy outcomes (Gortmaker 1979; Greenberg 1983; Showstack, Budetti, and Minkler 1984). Indeed, at least two studies suggest that early prenatal care has a more positive effect on birth outcomes for African Americans than for whites (Murray and Bernfield 1988; Showstack, Budetti, and Minkler 1984). Previous research, however, indicates that African Americans utilize prenatal care services less frequently than whites (Ingram, Makuc, and Kleinman 1986). Although racial differences in general health care utilization have received some attention (Aday and Andersen 1984; Blendon et al. 1989), there are rigorous investigations of the effects of race on prenatal care utilization. This article addresses this limitation by reporting an analysis of predisposing and enabling factors that affect black/white differences in utilization of prenatal care services.

## RACE AND USE OF HEALTH SERVICES

Prior to the 1970s, national surveys showed that African Americans were disadvantaged on all health services utilization measures, including preventive checkups, visits to physicians when ill, and the probability of being hospitalized (for a review, see Aday and Eichhorn 1972). Striking racial differences were also found in the location of usual sources of medical care. While African Americans were more likely than whites to receive care in hospital outpatient departments and emergency rooms (Neighbors 1986),

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they were less likely to be treated in a private physician's office (Aday and Eichhorn 1972).

Since passage of the Medicare and Medicaid legislation three decades ago, racial differences in utilization have narrowed markedly (Aday, Fleming, and Andersen 1984; Andersen and Anderson 1979; Trevino and Moss 1984). Indeed, because morbidity measures (e.g., perceived health status and disability) appeared to be the most important predictors of utilization in their studies, Aday and her colleagues (1984) have argued that utilization is now reasonably equitable for African Americans and whites.

While health services researchers acknowledge that remarkable progress has been made in eliminating racial differences in access to medical care, many have taken exception to Aday's conclusions (Blendon et al. 1989; Davis and Rowland 1983; Kleinman, Gold, and Makuc 1981; Wolinsky and Johnson 1991; Wolinsky et al. 1990). Blendon and colleagues (1989), for example, reported that African Americans were less likely to have a physician contact and more likely to have fewer visits per year than whites. These researchers noted that race remained a significant predictor of ambulatory visits even when health status was controlled. In addition, Hayward et al. (1988) found that even among insured, working-age adults, African Americans were more likely to report that they needed supportive medical care, medications, or supplies but were unable to obtain them. African Americans also continue to be disadvantaged with respect to obtaining quality health care (U.S. Department of Health and Human Services [DHHS] 1986).

Studies of racial differences in the use of prenatal health care services also document continuing disparities between African American and white women. Ingram, Makuc, and Kleinman (1986) found that, as late as 1983, 78.9 percent of white mothers received care in the first trimester of pregnancy, compared to 61.4 percent of African American mothers. Conversely, these figures indicate that nearly 30 percent of African American mothers experienced delayed care compared to approximately 20 percent of white mothers. These researchers grouped both black and white women into ten categories defined by marital status, maternal age, and educational attainment. Although the magnitude of the differences varied among the subgroups, racial differences were observed in all ten categories. Moreover, the Ingram group found that the proportion of African American mothers receiving early prenatal care actually decreased during the early 1980s. No similar decline was registered for white mothers. As a consequence, the gap between African American and white women appears to have widened slightly, rather than narrowed.

In addition to delayed care, African American women are more likely than their white counterparts to receive inadequate prenatal care, a measure that combines time of initial visit and total volume of visits. Defining inadequate care as care beginning after the fourth month of the pregnancy or having received fewer than half the recommended number of visits, Witwer (1990) reported that during 1981–1986, 27 percent of African American women received inadequate prenatal care compared to 13 percent of white women.

The reasons why African American women are less likely than white women to receive timely and adequate prenatal care are not completely understood. Relatively few studies have specifically addressed race differences in prenatal care utilization. Few published analyses were designed to assess the role of race in determining prenatal care utilization. Most of these studies have suffered from limited samples with few African American respondents (Donabedian and Rosenfeld 1961; Joyce et al. 1984; Lia-Hoagberg, Rode, Skovhold, et al. 1990; McDonald and Coburn 1988).

Other studies of prenatal care utilization have not taken advantage of adequate sample sizes to explore racial differences fully. Kalmuss and Fennelly (1990) interviewed low-income Latino and African American women who delivered in one of six New York City hospitals. These researchers collected information on structural and motivational barriers that impede care. However, their analysis strategy did not allow for an assessment of ethnic differences in the effects of these barriers. Similarly, Cooney's (1985) analysis of birth records reported odds of late or no prenatal care by mother's marital status, age, race, education, and insurance coverage. Although suggestive, the relative contribution of these factors to black-white differences in prenatal care was not explicit.

The purpose of this research is to address some of the previous shortcomings in the literature by examining factors that affect the use of prenatal care services by African American and white women. Specifically, the aim is to determine if black and white women face similar obstacles to care, and if the relative importance of these obstacles differs by race.

## DATA AND METHODS

*Data Collection.* Data for this analysis come from a survey conducted by the Michigan Department of Public Health. The questionnaire was administered at all Michigan hospitals that had an obstetrical unit. The

sample consists of all women who delivered during any consecutive seven-day period (selected by each survey site) between December 11, 1988 and January 9, 1989. Of the 2,106 women eligible for the study 90.1 percent provided complete questionnaires ( $n = 1,915$ ).

The completed questionnaire included answers to questions about demographic characteristics, as well as detailed data on prenatal care utilization, pregnancy outcome, insurance status (Medicaid, private insurance, uninsured), distance traveled to receive prenatal care, and other health behaviors. Only respondents who had singleton births and reported not having had pregnancy complications were included in these analyses. It was assumed that the inclusion of respondents who reported having had a "difficult pregnancy" might have the effect of biasing the analysis either because they might have an unusually high number of prenatal care visits or, alternatively, because their complications might be the result of having received inadequate prenatal care. These adjustments reduced the sample size to 1,772.

## ANALYSIS STRATEGY

This study uses the behavioral model, originally developed by Andersen (1968), as a guiding framework for examining use of prenatal health care services among African American and white women. The model posits that health services utilization is a function of three sets of characteristics: predisposing, enabling, and need. Originally, Andersen argued that persons with differing demographic, educational, or occupational characteristics, and health beliefs would have a greater or lesser propensity to use health services. In addition, Andersen specified that resources such as income and health insurance enabled individuals to act on their predispositions. Finally, the behavioral model stipulated that individuals must have perceived some need for utilizing services.

The variables assessed in this analysis include variables used in previous studies of prenatal care utilization (McDonald and Coburn 1988; Cooney 1985; Joyce et al. 1983). Predisposing variables include marital status, age, educational attainment, and per capita income. Respondents who were unmarried but "living together" are included as married. Educational attainment is categorized into non-high school graduate, high school graduate, college graduate, and some postgraduate school. Per capita income is categorized as total family income divided by the number of people in the

household. Unfortunately, measures of the respondents' health beliefs and attitudes were not available in this dataset so they could not be examined in this analysis.

Enabling variables include health insurance status, distance traveled to receive prenatal care, and an index that measures the geographic availability of clinics that provide obstetrical services. Health insurance is a dummy variable indicating whether or not the respondent's delivery was financed by a private insurance carrier (including an HMO). The obstetrical services index was calculated by first multiplying the average annual number of births (1984–1986) for the respondent's county of residence by the proportion of women in the county ages 15–44 with incomes below 185 percent of poverty. This product was then divided by the total number of clinics in the county. The obstetrical services index was scaled so that a higher value represented a county that has more obstetrical care resources. The index was extracted from Singh, Forrest, and Torres (1989). Race (African American versus white) was respondent self-report. Since all respondents in the sample were pregnant, the "need" component of the Andersen (1968) model is controlled by sample selection.

*Dependent Variables.* The primary outcome variable in this analysis is prenatal care utilization. Three measures of prenatal care utilization were developed. The first measure is the total number of prenatal contacts, including physician and nurse visits. The second measure, month of first visit, is an indicator of delay in receipt of care. The third measure is the Kessner index, a measure of the adequacy of prenatal care received during pregnancy (Kessner et al. 1973). See the appendix for a description of the Kessner index.

The first set of analysis represents bivariate analysis conducted to document the existence of race differences in prenatal care utilization. Then multivariate analysis focuses on the specification of models using the predisposing variables as predictors of prenatal care utilization. A binary variable (1 = black 0 = white) indicating race of the respondent is also added to this model. The aim at this first multivariate analysis stage is to determine if race differences in prenatal care utilization persist once known predisposing prenatal care utilization determinants are present in the model. The second stage of the multivariate analysis adds the enabling variables to the model.

The next stage of multivariate analysis tests the full model using race-stratified samples. Formal tests are then used to test for the existence of race differences in the magnitude of the effects of the predisposing and enabling variables on prenatal care utilization. The purpose of this analysis is to deter-

mine which, if any, predisposing or enabling factors have a different effect on prenatal care utilization, for African Americans compared to whites.

## RESULTS

Table 1 shows the distribution of the predisposing and enabling factors by race. The table shows a significant difference between black and white women in marital status. Slightly greater than 81 percent of white women in the sample reported that they were either married to or living with the father during their pregnancy compared to 29.4 percent of black women. However, no significant age difference was observed between black and white women. The mean age for black women was 23.9 and the white mean was 26.6.

White women were significantly more affluent than black women. The mean per capita income for black women was \$4,043 versus \$6,916 for

Table 1: Race Differences in the Independent and Dependent Variables

<i>Variable</i>	<i>Black (n = 275)</i>	<i>White (n = 1386)</i>	<i>Difference</i>
Married/Living together	29.4%	81.7%	$X^2 = 392^{***}$
Age	23.9	26.6	$F = 1.09$
Income (per capita)	\$4,043	\$6,916	$F = 1.24^{**}$
Private health insurance	39.19%	60.4%	$X^2 = 121^{***}$
Miles traveled for prenatal care	8.1	19.6	$F = 3.06^{***}$
Clinic availability index	367	295	$F = 4.00^{***}$
Education			
Non-high school graduate	34%	14.5%	
High school graduate	37%	41.7%	
College graduate	25.6%	36.6%	
Graduate school	2.9%	6.9%	$X^2 = 72.6^{***}$
Total prenatal care visits			
< 5	84.1%	91.2%	
6-8	9.9%	5.8%	
9-12	1.6%	2.0%	
> 12	4.4%	.9%	$X^2 = 24.4^{***}$
Month of first visit	2.4	2.2	$F = 1.94^{***}$
Kessner index	1.4	1.2	$F = 1.31^{**}$

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

whites. White women tended to have greater educational attainment than black women. Thirty-nine percent of black women and 60 percent of white women had private health insurance. Black women traveled an average of 8.1 miles to receive prenatal care compared to 19.6 miles for white women, and the average black women lived in a county with a maternal and child health clinic availability index of 367 compared to 295 for whites.

Table 2 shows the bivariate relationship between prenatal care utilization and race. The analysis displayed in the table shows regression analysis of a binary variable designating black race. The table indicates that African Americans have significantly fewer prenatal care visits during pregnancy, receive their first prenatal visit significantly later than whites, and receive less adequate prenatal care.

The analysis now turns to a multivariate assessment of race differences in prenatal care utilization controlling for predisposing factors (marital status, age, and education). Table 3 shows this analysis. The significant race effect in each model indicates that African Americans receive less prenatal care as measured by each indicator of utilization. African American women have fewer total prenatal contacts, start care later, and receive less adequate care. These findings suggest that race differences in prenatal care utilization are not a consequence of predisposing factors.

In Table 4 the analysis seeks to determine if the significant race effect reported in Table 3 is mediated by the enabling factors (income, insurance status, travel distance to prenatal care, and clinic availability). That is, can race differences in prenatal care utilization be attributed to enabling factors? This question was addressed by adding the enabling factors to the models specified in Table 3. This analysis indicates that race differences persist in the total number of prenatal contacts and the Kessner index. However, the race effect on start of prenatal care is reduced to nonsignificance once the enabling factors are controlled. This suggests that observed race differences in the initiation of prenatal care are due to a lack of enabling resources for

Table 2: Regression of Prenatal Care Utilization on Race

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Intercept	3.25	2.22	2.76
Race (black)	-.524***	.251**	-.361***
<i>R</i> <sup>2</sup>	.05	.004	.06
<i>R</i> <sup>2</sup> (adj.)	.05	.004	.06

\**p* < .1; \*\**p* < .05; \*\*\**p* < .005.



Table 3: Prenatal Care Utilization Regressed on Predisposing Factors

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Intercept	3.001	3.315	2.504
Married	.132**	.170*	.144***
Age	-.004	-.018**	-.002
Education	.046***	-.084***	.033***
Race	-.273***	.226**	-.233***
$R^2$	.05	.06	.09
$R^2$ (adj.)	.05	.05	.09

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

Table 4: Prenatal Care Utilization Regressed on Predisposing and Enabling Factors

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Intercept	2.954	3.191	2.519
Married	.059	.059	.072*
Age	-.006	-.012	-.004
Education	.033**	.039**	.019**
Income	.001*	-.001***	.001***
Private	.098*	-.322***	.093**
Distance	.002	.001	.001
Clinic	.001*	-.001	.001
Race	-.261***	.178	-.219***
$R^2$	.06	.09	.11
$R^2$ (adj.)	.06	.08	.10

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

African Americans. However, once prenatal care is initiated, black women still receive fewer prenatal care contacts and less adequate care.

In the analysis in the previous tables we tested for race differences in the intercepts, attempting to determine which variables contribute to mean race differences in prenatal care utilization. The next set of analyses seeks to assess the magnitude of the effects of the independent variables for each race group. By estimating the model in race-stratified samples, we can estimate slopes for each race group and conduct tests to determine if there are significant differences across race in the effects of the independent variables.

These analyses are summarized in Tables 5 and 6. Table 5 displays the results for whites and Table 6 displays the results for African Americans. Table 5 shows that education, per capita income, and the degree to which maternal and child health clinics are available are significant predictors of prenatal contacts for whites. The analysis also shows that per capita income and private health insurance are predictors of initiation of prenatal care, and that education, per capita income, and private insurance are predictors of receiving adequate care.

Table 6 shows similar analysis for African Americans. This analysis indicates that educational attainment and private insurance are significant

Table 5: Prenatal Care Utilization Regressed on Predisposing and Enabling Factors for Whites

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Intercept	3.029	3.008	2.538
Married	.055	.032	.045
Age	-.006	-.007	-.002
Education	.024**	-.030	.015**
Income	.001*	-.001***	.001***
Private	.054	-.292***	.069*
Distance	.001	.001	.001
Clinic	.001*	.001	.001
$R^2$	.03	.07	.06
$R^2$ (adj.)	.02	.07	.05

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

Table 6: Prenatal Care Utilization Regressed on Predisposing and Enabling Factors for Blacks

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Intercept	2.009	5.345	2.225
Married	.064	.198	.173
Age	-.009	-.039	-.011
Education	.106*	-.129	.059**
Income	.001	.001	-.001
Private	.329*	-.593*	.229*
Distance	.004	.001	.001
Clinic	.001	-.002	.001
$R^2$	.13	.13	.13
$R^2$ (adj.)	.08	.08	.08

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

predictors of prenatal contacts. Private insurance is the only significant predictor of initiation of care for African Americans. And education and private insurance are significant predictors for receiving adequate care.

Table 7 shows the result of analysis that tests for a significant difference between the parameters for each model displayed in Tables 5 and 6. We conducted a formal test for significant race differences in the magnitude of the effects of each predisposing and enabling variable on prenatal care utilization. These analyses were conducted by computing the following statistic:

$$T^* = \frac{b_{ib} - b_{iw}}{SE_{ib}^2 + SE_{iw}^2} \quad (1)$$

where:  $b_{ib}$  refers to the unstandardized coefficient for independent variable  $i$  for the black model,  $b_{iw}$  refers to the unstandardized coefficient for independent variable  $i$  for the white model and  $SE_{ib}^2$  refers to the standard error for independent variable  $i$  for the black model, and  $SE_{iw}^2$  refers to the standard error for independent variable  $i$  for the white model (Marascuilo and Levin 1983).

The results of this analysis are displayed in Table 7. They indicate that education has a significantly stronger effect on prenatal contacts and adequacy of care received (Kessner index) for African Americans than for whites. There is also a significant race difference in the effect of private insurance on total prenatal visits. African Americans benefit more from private insurance than whites with regard to total prenatal care visits. Finally, African Americans derive greater benefit from an increased availability of maternal and child health clinics with regard to the initiation of prenatal care than do whites.

Table 7:  $t$ -Test for Significant Race Differences in the Effects of Each Independent Variable on Prenatal Care Utilization

<i>Variables</i>	<i>Contacts</i>	<i>First Visit</i>	<i>Kessner</i>
Married	-.04	-.50	-1.04
Age	.20	1.10	.79
Education	-1.68**	1.13	-1.39*
Income	.30	-.61	.82
Private	-1.31*	.82	-1.17
Distance	-.05	.07	-.05
Clinic	-.76	1.48*	.04

\* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .005$ .

## DISCUSSION

We sought to determine the factors that account for race differences in prenatal care utilization. Continued research on this issue is important because prenatal care is an important factor in improving the likelihood of having a positive pregnancy outcome. This analysis used the model of health services utilization developed by Andersen (1968), which specifies health services utilization as a function of need, predisposing, and enabling factors.

The analysis found somewhat mixed results in explaining race differences in prenatal care utilization. The predisposing factors did not explain race differences in prenatal care utilization. And, although enabling factors did explain race differences in the timing of the initiation of prenatal care, they were not able to explain race differences in total prenatal care contacts or in adequacy of the care received.

*What, then, explains black/white differences in prenatal care utilization?* Race has both social and behavioral components (LaVeist 1994). Previous research has speculated on each of these components. One social factor that may contribute to answering the paradox of race differences in prenatal care utilization is education. We found that increasing education more strongly increases prenatal care utilization for African Americans compared to whites. However, the African American women in our sample were significantly less well educated than the white women.

Policies that move black women from Medicaid to private insurance, increase black educational attainment, and foster greater availability of maternal and child health clinics will reduce the race disparity in prenatal care utilization. However, this alone will not eliminate race differences.

Table 1 indicates that black women already tend to live in counties that have a greater availability of health clinics that provide some obstetrical services. This is probably due to the clustering of African Americans in urban counties. However, it is also probable that these clinics are limited in their service capabilities compared to many physicians in private practice.

Moreover, specific source of care is an issue in need of further examination. As Buescher and Ward (1992) showed, in some cases public sources of prenatal care may be more effective than private sources. Previous studies have speculated that race differences in health services utilization may be caused by cultural values that cause an orientation in African Americans toward health services utilization leading to underutilization (Stahl and Gardner 1976). The data in this study did not allow for a direct examination of this issue. However, the stronger effect of private insurance and clinic

availability for African American women compared to white women does suggest that structural factors play a particularly important role in determining prenatal care utilization for black women and may, in fact, be more important than cultural or behavioral differences.

It is important to note that, while the combination of predisposing and enabling factors was able to fully explain race differences in the initiation of prenatal care, this combination could not explain race differences in total prenatal care contacts or in adequacy of the care received. This suggests that there is no "true" race difference in the desire to obtain prenatal care. However, once prenatal care has begun, there are factors—not assessed in the present model—that have a differential impact on black and white women, influencing their willingness or ability to continue in care. There is reason to suspect that these factors may be occurring not as a result of the patient's proclivity to use health services or enabling attributes; rather, factors on the "supply side" may exist that negatively affect black women once they come into contact with the health care delivery system.

It is possible that there are systematic biases in the availability of health services emanating from differential treatment received from the health care system. These differences in treatment may be due to problems emanating from provider-patient interaction (Terrell and Terrell 1983, 1984; Terrell, Terrell, and Taylor 1981).

Moreover, African Americans are greatly dependent on Medicaid. Medicaid recipients presumably are at a disadvantage with regard to "purchasing" the "gold standard of care" provided by physicians in private practice. They are probably exposed to longer waiting room delays and to greater difficulty in getting appointments and finding physicians who will accept Medicaid; and they may be generally exposed to treatment that discourages health services utilization (Dutton 1978).

It would be instructive for future research to examine the ways in which health services (supply side) factors may be differentially affecting black and white women's utilization of prenatal care services.

**Appendix: Criteria for Adequacy of Care Index Level**

<i>Adequacy of Care</i>	<i>Trimester of First Prenatal Visits</i>	<i>Gestation (Weeks)</i>	<i>Number of Prenatal Visits</i>
Adequate	First (1-3 months)	13 or less	1 or more/not stated
		14-17	2 or more
		18-21	3 or more
		22-25	4 or more
		26-29	5 or more
		30-31	6 or more
		32-33	7 or more
		34-35	8 or more
		36 or more	9 or more
Inadequate	Third (7-9 months)	14-21	0/not stated
		22-29	1 or less/not stated
		30-31	2 or less/not stated
		32-33	3 or less/not stated
		34 or more	4 or less/not stated
Intermediate	All other conditions		

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